



SUCCESS STORIES

The goal of the Million Solar Roofs Initiative is to install one million solar energy systems on U.S. buildings by 2010. President Clinton announced the Initiative on June 26, 1997 in a speech before the United Nations Session on Environment and Development. The Initiative focuses on two types of solar energy technology — photovoltaics that produce electricity from sunlight, and solar thermal systems that produce heat for domestic hot water, space heating or heating swimming pools. The U.S. Department of Energy leads this effort in partnership with the building industry, other federal agencies, utilities, the solar energy industry, financial institutions, state and local governments, and non-governmental organizations. These partnerships concentrate on removing market barriers and developing and strengthening demand for solar energy products and applications. As progress is made toward the goal of one million solar roofs, greenhouse gases and other harmful emissions will be reduced, high tech jobs will be created, and the U.S. solar energy industry will retain its competitive edge.



Project: Volcanoes National Park

Type: Hybrid Photovoltaic-Propane Power System

Location: Ainahou Ranch,
Volcanoes National Park, Hawaii

Background: Ainahou Ranch is an historic National Park Service (NPS) site acquired by Volcanoes National Park in 1972. Founded in 1941, the ranch originally belonged to the Shipman family, who ran it until the 1960s. The grounds are home to both a rare Hawaiian goose that once faced extinction as well as an extensive potable water catchment and distribution system. As part of the restoration activities taking place at the ranch facility, NPS staff installed a hybrid photovoltaic-propane power system so that it could be used for group retreats and environmental education programs.

Since September 1998, the prefabricated hybrid PV-propane power system has been operating at the ranch facility, thanks to the combined efforts of staff in the NPS, Hawaii Electric Light Co., Inc. (HELCO), and the U.S. Department of Energy's Federal Energy Management Program (FEMP). Nick Heinrich, Maintenance Division, Volcanoes National Park, said, "The power provided by the photovoltaic system is invaluable for the restoration and future operation of the ranch. It is far superior to a diesel generator with all its inherent problems of noise, smell, safety, and transportation of fuel."

System Description:

The prefabricated, self-contained, portable energy shed installed at the ranch facility has a steel frame permanently anchored in a concrete foundation. It is enclosed in a plywood structure that supports and protects the PV power system. The PV modules in the power system are mounted onto the roof of the structure, and the roof is pitched approximately 30 degrees, which corresponds to the angle of the winter sun. The system includes a 900-peak-watt photovoltaic array containing 18 modules manufactured by ASE Americas, Inc.; an Ananda Power Technologies, Inc. charge controller; a Trace Engineering Company 4024 sine wave inverter; eight Trojan L-16 batteries for storage; and one Onan 4.5-kilowatt backup propane generator.





Climate: Hawaii's climate is warm, temperate, and sunny. Its climate and high utility costs make it the first in a list of U.S. states in which the cost of solar electricity is already competitive with several other types of power production.

Financing: The cost of the self-contained, prefabricated PV system was provided by a \$22,500 grant from the Federal Energy Management Program

(FEMP). This grant covered the cost of materials needed to hook-up the system with the main electrical service of the ranch house, and the cost of labor needed to integrate the backup generator with the PV energy system. Hawaii Electric Company Inc. donated \$7,500 in design, transportation, and installation services.

Total Installed Cost: The total installed project cost was \$30,000.

Optimum Maintenance Costs: It is expected that the backup propane generator will be run approximately 150 hours per year at an estimated annual cost of \$270. All components of the PV system as well as the generator have an expected life longer than the payback period of 5.75 years, given estimated savings.

Savings: Annual savings, in comparison to the cost of operating and maintaining a diesel generator system, are estimated to be \$3,474.

Environmental Benefits: In addition to dramatic reductions of carbon dioxide and other greenhouse gas emissions, using solar energy systems instead of fossil fuel generators also eliminates the risk of fuel spills that can occur when fuels have to be transported to remote areas such as Volcanoes National Park. Solar energy systems are also quieter than diesel systems, enhancing the quality of life at their point of use.

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